

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Sugimoto et al.

Serial No.: Not yet known Examiner: Not yet known

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Title: SODIUM-BASED DECHLORINATING AGENT AND WASTE  
TREATMENT EQUIPMENT

Division of: U.S. Patent Application Serial No. 09/704,894  
filed November 2, 2000.

Box New Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Dear Sir:

Prior to calculating the filing fee, kindly enter the following amendment in the  
accompanying divisional application.

**In the Specification:**

Please replace the paragraph beginning on page 10, line 5 and ending on page 11, line 5  
with the following rewritten paragraph:

--The waste treatment equipment of the present invention comprises a pyrolytic  
reactor which causes pyrolysis of waste to generate pyrolytic gases and pyrolytic residue  
mainly comprising non-volatile constituents; separating means for separating the

pyrolytic residue into combustible constituents and incombustible constituents; a combustion melting furnace to which the pyrolytic gases and the combustible constituents are fed, and which causes combustion thereof and discharges molten slag and flue gases; first flue gas treating means for removing dust from the flue gases; second flue gas treating means dechlorinating the flue gases from the first flue gas treating means by adding a dechlorinating agent; a separator which separates water-insoluble constituents not dissolved in water from an aqueous solution containing the residue of dechlorination dissolved therein by adding water to the residue of dechlorination generated by the second flue gas treating means; a pH modifier which adjusts pH of the remaining aqueous solution after separation by the water-insoluble constituents by the separator; and at least another one dioxin removing unit which removes dioxin and the like from the residue of dechlorination generated by the second flue gas treating means and/or from the aqueous solution of which pH has been adjusted by the pH modifier; wherein a sodium-based dechlorinating agent is added to the second flue gas treating means.--

In the Claims:

Please cancel original claims 1-21, without prejudice and add the following new claims:

22. A waste treatment equipment comprising:

a pyrolytic reactor which causes pyrolysis of waste to generate pyrolytic gases and pyrolytic residue mainly comprising non-volatile constituents; separating means for

separating said pyrolytic residue into combustible constituents and incombustible constituents;

a combustion melting furnace to which said pyrolytic gases and said combustible constituents are fed, and which causes combustion thereof and discharges molten slag and flue gases;

first flue gas treating means for removing dust from said flue gases;

second flue gas treating means dechlorinating the flue gases from said first flue gas treating means by adding a dechlorinating agent;

a separator which separates water-insoluble constituents not dissolved in water from an aqueous solution containing a residue of dechlorination dissolved therein by adding water to a residue of dechlorination generated by said second flue gas treating means;

a pH modifier which adjusts pH of a remaining aqueous solution after separation of the water-insoluble constituents by said separator;

at least one dioxin removing unit which removes dioxin and the like from the residue of dechlorination generated by said second flue gas treating means and/or from the aqueous solution of which pH has been adjusted by said pH modifier; and wherein

a sodium-based dechlorinating agent comprising a mixture of sodium hydrogencarbonate and a hydrophilic anti-caking agent, and having an angle of repose of 40° or more, a dispersibility of less than 50 and a floodability index value of less than 90, serving as said dechlorinating agent, is added to said second flue gas treating means.

23. A waste treatment equipment according to claim 22, wherein said sodium hydrogencarbonate has a mean particle diameter within a range of from  $2 \mu\text{m}$  to  $30 \mu\text{m}$ .
24. A waste treatment equipment according to claim 22, wherein said hydrophilic anti-caking agent comprises silica, and 0.1 mass % or more of said hydrophilic anti-caking agent is mixed into said sodium-based dechlorinating agent.
25. A waste treatment equipment according to claim 22, wherein said sodium hydrogencarbonate has a mean particle diameter within a range of from  $2 \mu\text{m}$  to  $30 \mu\text{m}$ , said hydrophilic anti-caking agent is a silica-based anti-caking agent, and 0.1 mass % or more of said hydrophilic anti-caking agent is mixed into said sodium-based dechlorinating agent.
26. A waste treatment equipment according to claim 22, wherein said hydrophilic anti-caking agent has a mean particle diameter within a range of from  $0.001 \mu\text{m}$  to  $1 \mu\text{m}$ .
27. A waste treatment equipment according to claim 22, further including a mercury removing unit which removes mercury from the remaining aqueous solution after separation of the water-insoluble constituents.
28. A waste treatment equipment according to claim 22, further including a mixer for mixing said sodium hydrogencarbonate and said hydrophilic anti-caking agent and a grinder for grinding said sodium hydrogencarbonate.

29. A waste treatment equipment according to claim 26, wherein, in said grinder, said sodium hydrogencarbonate is ground into a mean particle diameter within a range of from 2  $\mu\text{m}$  to 30  $\mu\text{m}$ .

30. A waste treatment equipment according to claim 22, wherein a mercury removing unit for removing mercury from the aqueous solution of which pH has been adjusted by said pH modifier is provided downstream of said pH modifier.

31. A waste treatment equipment comprising:

means for dechlorinating a flue gas which causes hydrogen chloride contained in said flue gas to react with a sodium-based dechlorinating agent to remove sodium chloride as residue of dechlorination, removing dioxin and the like from said residue of dechlorination, then, dissolving said residue of dechlorination by adding water, separating water-insoluble constituents not dissolved in water from an aqueous solution in which said residue of dechlorination is dissolved, and adjusting pH of a remaining aqueous solution after separation of said water-insoluble constituents; and

said sodium-based dechlorinating agent comprising a mixture of sodium hydrogencarbonate and a hydrophilic anti-caking agent, and having an angle of repose of 40° or more, a dispersibility of less than 50 and a floodability index value of less than 90.

32. A waste treatment equipment according to claim 31, wherein said sodium hydrogencarbonate has a mean particle diameter within a range of from 2  $\mu\text{m}$  to 30  $\mu\text{m}$ .

33. A waste treatment equipment according to claim 31, wherein said hydrophilic anti-caking agent comprises silica, and 0.1 mass % or more of said hydrophilic anti-caking agent is mixed.

34. A waste treatment equipment according to claim 31, wherein said sodium hydrogencarbonate has a mean particle diameter within range of from  $2 \mu\text{m}$  to  $30 \mu\text{m}$ , said hydrophilic anti-caking agent comprises silica, and 0.1 mass % or more of said hydrophilic anti-caking agent is mixed.

35. A waste treatment equipment according to claim 31, wherein said hydrophilic anti-caking agent has a mean particle diameter within a range of from  $0.001 \mu\text{m}$  to  $1 \mu\text{m}$ .

36. A waste treatment equipment according to claim 31, wherein said means for dechlorinating removes dioxin and the like remaining after removal again after pH adjustment.

REMARKS

By this Amendment, all of the original claims of the parent application, which were the subject of a three-way Restriction Requirement, are being canceled. New claims 22-36, all directed to the same aspect of the invention, i.e. waste treatment equipment, are being added. The addition of "new matter" has been scrupulously avoided.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

Favorable consideration of the pending claims is respectfully requested.

Respectfully submitted,



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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**In the Specification:**

Paragraph beginning on page 10, line 5 and ending on page 11, line 5 has been amended as follows:

The waste treatment equipment of the present invention comprises a pyrolytic reactor which causes pyrolysis of waste to generate pyrolytic gases and pyrolytic residue mainly comprising non-volatile constituents; [separately] separating means for separating the pyrolytic residue into combustible constituents and incombustible constituents; a combustion melting furnace to which the pyrolytic gases and the combustible constituents are fed, and which causes combustion thereof and discharges molten slag and flue gases; first flue gas treating means for removing dust from the flue gases; second flue gas treating means dechlorinating the flue gases from the first flue gas treating means by adding a dechlorinating agent; a separator which separates water-insoluble constituents not dissolved in water from an aqueous solution containing the residue of dechlorination dissolved therein by adding water to the residue of dechlorination generated by the second flue gas treating means; a pH modifier which adjusts pH of the remaining aqueous solution after separation by the water-insoluble constituents by the separator; and at least another one dioxin removing unit which removes dioxin and the like from the residue of dechlorination generated by the second flue gas treating means and/or from the aqueous solution of which pH has been adjusted by the pH modifier; wherein a sodium-based dechlorinating agent is added to the second flue gas treating means.--

In the Claims:

Original claims 1-21 have been canceled and new claims 22-36 have been added.